

5/PRTS

JC17 Rec'd PCT/PTO 20 SEP 2005

## Locking device and headrest

## Description

5 The invention relates to a locking device according to the precharacterizing clause of claim 1. For motor vehicles, in particular, headrests are used which provide a user of the vehicle with increased comfort and increased security against possible sources of  
10 risks, for example in the case of accidents, by means of a supporting or retaining function of body parts, in particular of the head. Headrests of this type are generally provided in a manner such that they can be set in order to be able to be adapted, for example, to  
15 users of different heights. In order to set the headrests, the latter can be locked mechanically in a plurality of positions. The setting of the headrests is to be possible easily, simply and with little effort. At the same time, however, once a headrest is set and  
20 locked, as good locking as possible against forces which will potentially move the headrest out of the set position is to be ensured. Headrests of this type and the individual parts of which they are composed are furthermore to be able to be produced and assembled  
25 simply and cost-effectively, with the result that the production of headrests of this type can be carried out simply, rapidly and cost-effectively.

For example, European patent specification  
30 EP 0 864 461 B1 discloses a headrest for motor vehicle seats with a rapid height adjustment. In this case, two wire springs are provided which can be bent by at least one actuating rod, so that the locking brought about by the two wire springs in their normal position is  
35 canceled. However, in the case of such a construction of a headrest, it is disadvantageously envisaged using two separate springs. Furthermore, special C-shaped springs are used which can only be fitted in a

comparatively time-consuming manner, in a comparatively complicated manner and with a comparatively large exertion of force. Furthermore, the two springs used have a different locking effect, for example due to manufacturing fluctuations. On account of the use of two separate springs and two separate retaining rods, this has the effect of the support being possibly able to be positioned in different adjusting positions, i.e., for example, "obliquely", on the different retaining rods, which may result in disadvantageous consequences, in particular with regard to protecting occupants in motor vehicles in hazardous situations.

The invention is therefore based on the object of providing a locking device in which the disadvantages occurring in the case of the locking devices known from the prior art are avoided.

This object is achieved according to the invention by a locking device which is provided in a manner such that it can be adjusted relative to at least two retaining rods, the locking device having spring means which are provided in a manner such that they can be set at least into one locking position, the spring means in their locking position, in interaction with recesses in the retaining rods, causing the locking device to be locked relative to the retaining rods, the spring means being provided in such a manner that the locking of the at least two retaining rods can be brought about by a mechanical fixing of the spring means in a central region or that the locking of the at least two retaining rods can be brought about by an application of force on the spring means in a central region. In one preferred embodiment of the locking device, the spring means are provided as a spring provided as a single part. In a further preferred embodiment of the locking device, the spring means are provided as a spring extending in an elongate manner essentially

between the two retaining rods. In a further preferred embodiment of the locking device, the spring means are provided in such a manner that they comprise at least one central part and end parts. Such locking devices

5 according to the invention have the advantage that the spring means have a uniform locking effect on both retaining rods, since the locking effect for the alternative of exerting a force on the spring means in the central region - in contrast to merely fixing the

10 spring means without a noticeable application of force on the spring means - is brought about in particular by a single elastic deformation of the spring means, in particular in the central region of the spring means.

15 In a further preferred embodiment of the locking device according to the invention, the spring means, in addition to their locking position, are provided in a manner such that they can be set into a release position, the spring means interacting with the

20 recesses of the retaining rods in such a manner that, when the spring means are set in their release position, the recesses are opened up. In a further preferred embodiment of the locking device according to the invention, the latter has a sliding element which

25 can be set at least in a first position and in a second position, the spring means interacting with the sliding element in such a manner that, when the sliding element is set into its first position, the spring means take up their locking position and that, when the sliding

30 element is set into its second position, the spring means take up their release position. In a further preferred embodiment of the locking device according to the invention, the sliding element has a plurality of projections and the spring means have a plurality of

35 actuating regions, a movement of the sliding element parallel to a plane defined by the at least two retaining rods bringing about a movement of the actuating regions which is essentially vertical

thereto. In a further preferred embodiment of the locking device according to the invention, the spring means are elastically deformed by the movement of the actuating regions. In a further preferred embodiment of the locking device according to the invention, the actuating regions are of wedge-like design. In a further preferred embodiment of the locking device according to the invention, the locking device has a bearing point, the bearing point preventing a movement of the central region of the spring means during the movement of the actuating regions. Such locking devices according to the invention have the advantage of being able to be produced and fitted in a very simple and sturdy manner.

15 A further subject matter of the present invention is a headrest which is used, in particular, in a motor vehicle. According to the invention, the headrest here is connected fixedly to a locking device according to the invention. In particular, the design of the headrest according to the invention means that the locking device according to the invention cannot be seen at all from outside the headrest or at most partially, for example through an actuating device. In this case, the headrest has, in particular, a frame which has guide elements for retaining rods or is connected thereto. The retaining rods protrude in particular out of the upper boundary surface of a backrest of a seat of a motor vehicle, with the result that, with the setting of the backrest in a manner such that it is generally essentially vertical or is inclined slightly in relation to the vertical, the retaining rods are essentially vertical or likewise slightly inclined in relation to the vertical.

35 According to the invention, the headrest is therefore height-adjustable with the retaining rods extending essentially vertically.

The invention is explained in more detail below with reference to an exemplary embodiment which is illustrated in the drawing, in which

- 5 Figure 1 shows a headrest according to the invention with retaining rods and an indicated locking device according to the invention,
- Figure 2 shows part of a headrest according to the invention with the locking device indicated,
- 10 Figure 3 shows an exploded drawing of individual parts of the headrest according to the invention and in particular of the locking device according to the invention,
- Figure 4 shows a plan view in the direction of the retaining rods of the locking device
- 15 according to the invention, with the spring means being situated in their locking position, and
- Figure 5 shows a plan view in the direction of the retaining rods of the locking device
- 20 according to the invention, with the spring means being situated in their release position.
- 25 Figure 1 illustrates a headrest 10 according to the invention with retaining rods 20 and an indicated locking device according to the invention which is not, however, denoted by a reference number. The retaining rods 20 here are fastened by their lower part 21 in
- 30 particular in a backrest (not illustrated) of a seat of a motor vehicle. According to the invention, the headrest 10 has, in a manner known from the prior art, a comparatively soft material which is denoted by the reference number 11, makes up the major part of the
- 35 volume of the headrest 10 and serves for supporting and stabilizing in particular the head of a user of the headrest.

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Figure 2 illustrates part of a headrest 10 according to the invention with the locking device indicated. In this case, the headrest 10 comprises, in particular, a frame 15 which is likewise known from the prior art and gives the headrest an inherent mechanical support. Figure 2 furthermore illustrates the retaining rods 20, their recesses 22 and their lower parts 21. According to the invention, the recesses 22 are provided in particular as notches 22. Furthermore, figure 2 illustrates the spring means 30. The spring means 30 are provided in particular as a spring 30 extending in an elongate manner between the retaining rods 20. In one preferred embodiment of the invention, the spring 30 is provided in particular as a single part by means of spring wire. In another preferred embodiment of the invention, the spring 30 is provided in a central section, which is formed by a central part, as a plastic part and is provided in its end sections as a metal end part or as a plurality of metal end parts.

Figure 3 illustrates an exploded drawing of individual parts of the headrest 10 according to the invention and in particular of the locking device according to the invention. The headrest 10 comprises the frame 15 and guides 17 in which the retaining rods 20 are guided. According to the invention, the locking device has a support part 50 which bears the components required for locking the locking device relative to the retaining rods 20, and is at least partially mechanically fixed. According to the invention, the support part 50 is connected in particular to the guides 17 and is provided as a single part with them, for example as a plastic or metal injection-molded part. The spring 30 and a sliding element 40 are placed onto or into the support part 50, with both the spring 30 and the sliding element 40 being provided in a manner such that they can be moved mechanically within limits in or on the support part 50. The support part 50

has - connected as a single part in figure 3 - a receptacle 54 for an actuating device 70. However, according to the invention, a receptacle 54 (not illustrated) which is not provided as a single part with the support part 50 is likewise possible. According to the invention, the actuating device 70 is realized, in particular, by means of an actuating guide 60, a restoring spring 62 and an actuating button 64. In this case, the actuating button 64 is connected mechanically to the sliding element 40, in particular by means of a latching connection, and is accessible to a user (not illustrated in figure 3) of the locking device from outside the headrest 10. However, according to the invention, a different design of the actuating device 70 and a different connection of the sliding element 40 to a component of the actuating device 70 that is accessible to the user of the locking device is likewise possible.

Figure 4 illustrates a plan view of the locking device according to the invention in the direction of the retaining rods 20, with the spring means 30 being situated in their locking position, and figure 5 illustrates a plan view of the locking device according to the invention in the direction of the retaining rods 20, with the spring means 30 being situated in their release position. The locking position of the spring 30 is characterized in that locking regions 31 of the spring 30 bear against the retaining rods 20. In this case, the sliding element 40 is set in a first position. According to the invention, this position is brought about in particular by the spring action of the restoring spring 62 (not illustrated in figures 4 and 5 for the sake of simplicity) of the actuating device 70 on the actuating button 64 and therefore on the sliding element 40. According to the invention, the sliding element 40 has projections 42, 43 which can lead to a movement of the spring 30 during a movement of the

sliding element 40. The first position of the sliding element 40, which position is illustrated in figure 4, is characterized in that the projections 42, 43 at most bear against the spring 30 but do not exert a force on the spring. The exertion of such a force would impair the locking effect of the spring 30 on the retaining rods 20. In the exemplary embodiment illustrated, the locking regions 31 are provided in particular at the two ends of the spring 30 extending in an elongate manner. The locking of the retaining rods 20 relative to the locking device or relative to the headrest 10 is brought about here by the fact that the locking regions 31 of the spring 30 engage in the recesses 22 (not illustrated in figures 4 and 5) of the retaining rods 20. In this case, it is provided according to the invention both that the spring 30 is already "prestressed" in its locking position and an application of force of the spring 30 on the retaining rods 20 is therefore provided. According to the invention, this application of force of the spring 30 is brought about in particular by a bearing point 52 which is provided on the support part 50. In this connection, the support part 50, by means of the bearing point 52, exerts an application of force on the spring 30, in particular in a central region 35 of the spring 30. This causes an elastic bending of the spring 30, in particular in its central region 35, and therefore an identical exertion of force on both retaining rods 20 or on their recesses 22. According to the invention, the central region 35 of the spring 30 is provided in particular approximately in the center between the retaining rods 20, but this is not necessarily the case according to the invention.

35 In an alternative embodiment of the invention, the spring 30 bears merely against the two retaining rods 20 and the bearing point 52. By means of the mechanical fixing of the spring 30 on the bearing point



52 - according to the invention in particular in the central region 35 - in the case of the alternative embodiment, locking of the locking device relative to the retaining rods 20 is already provided. It is clear that, in the case of locking without application of force in the locking position of the spring 30, the ability to fit the spring 30 is facilitated, but this is associated with a slightly less good locking.

10 The release position (illustrated in figure 5) of the spring 30 is characterized in that the locking regions 31 of the spring 30 release the retaining rods 20 and therefore open up the recesses 22, i.e. the locking regions 31 of the spring 30 are provided at a distance from the retaining rods 20. As a result, it is possible for the retaining rods 20 to be easily displaceable in their longitudinal direction, i.e. perpendicular with respect to the plane of the drawing in figures 4 and 5, in relation to the locking device. According to the invention, the release position of the spring 30 is brought about, starting from its locking position, in particular by the fact that the sliding element 40 is brought into its second position illustrated in figure 5. In this case, the sliding element 40 is displaced to the left, starting from its position in figure 4, relative to the support part 50, and the projections 42, 43 on the sliding element 40 together with wedge-like actuating regions 32, 33 of the spring 30 bring about a movement of the spring 30 into its release position. In this case, in particular, the locking regions 31 of the spring 30 move in a direction perpendicular with respect to the direction of movement of the sliding element 40. The movement of the sliding element 40 takes place here in a plane parallel to the plane which is perpendicular to the plane of the drawing in figure 5 and is defined by the two retaining rods 20.

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In the alternative embodiment, in which the spring 30 is provided in a central section, which is formed by a central part, as a plastic part and with the spring being provided in its end sections as a metal end part  
5 or as a plurality of metal end parts, the invention makes provision in particular for the end parts to form the locking regions 31 and for the central part to form the remaining sections of the spring 30, in particular the actuating regions 32, 33.

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## List of reference numbers:

10	Headrest
11	Material of the headrest
15	Frame
17	Guides
20	Retaining rods
21	Lower part of the retaining rods
22	Recesses
30	Spring means
31	Locking regions
32, 33	Actuating regions
35	Central region
40	Sliding element
42, 43	Projections
50	Support part
52	Bearing point
54	Receptacle
60	Actuating guide
62	Restoring spring
64	Actuating button
70	Actuating device